We claim:

1. A capacitive vacuum measuring cell with a first housing body (1) made of Al_2O_3 with a membrane (2) arranged at a small distance from said housing body with an edge seal in such a way that in between a reference vacuum chamber (25) is created where the surfaces of membrane (2) and the housing body (1) located at a small distance opposite each other are coated with an electrically conductive material (7) and constitute the measuring capacitance, and where a second housing body (4) made of Al_2O_3 and featuring an edge seal is located opposite membrane (2) which together with said membrane forms a measurement vacuum chamber (26) in which ports (5) are provided for connecting the medium to be measured.

2. A measuring cell according to claim 1 where the electrodes (7) that enclose reference vacuum chamber (25) and which constitute the measurement capacitance are arranged at a distance of 2 µm to 50 µm, preferably 12 to 35 µm.

3. A measuring cell according to claim 1 in which the first housing body (1) and the second housing body (4) with intermediate membrane (2) are symmetrically and tightly connected in the edge zone essentially without any stress.

4. A measuring cell according to claim 3 where the connection is implemented by fusion, by diffusion bonding or preferably by soldering and/or brazing, in particularly with glass soldering and/or brazing material.

5. A measuring cell according to claim 1 where membrane (2) has a thickness in the range of 10 µm to 250 µm, preferably 10 µm to 120 µm.

6. A measuring cell according to claim 5 where the mean grain size of the membrane material is ≤20 µm, preferably ≤ 10 µm, in particular ≤ 5 µm.

7. A measuring cell according to claim 5 where, in the cross-section of membrane (2), at least 2 grains, preferably at least 5 grains, exist across the thickness.

8. A measuring cell according to claim 1 wherein the unevenness of membrane (2) across its entire surface is not greater than 30% of the electrode spacing, preferably not greater than 15%.

9. A measuring cell according to claim 1 wherein the unevenness of membrane (2) across

its entire surface is not greater than 10 µm, preferably not greater than 5 µm.

10. A measuring cell according to claim 1 wherein the purity of the Al_2O_3 of membrane (2) is at least 94%, preferably at least 99%.

11. A measuring cell according to claim 1 where the contacts to the electrically conductive layers (7) are led out through sealed feedthroughs (6) on the first housing body (1).

12. A measuring cell according to claim 1 where on or in the first housing (1) a volume (13) for accommodating getter (10) is provided which features a connection (14) to the reference vacuum chamber (25) and where the volume (13) is sealingly tightly closed with a cover (8).

13. A measuring cell according to claim 12 where the getter is of the "non-evaporating" type.

14. A measuring cell according to claim 12 where getter (10) within volume (13) is pressed by means of spring (11) against cover (8).

15. A measuring cell according to claim 12 where a contacting material (12), preferably a soldering and/or brazing material, is provided between getter (13) and cover (8).

16. A measuring cell according to claim 1 where the pressure in the reference vacuum chamber (25) is lower than the lowest pressure to be measured, preferably lower by at least one decade.

17. A measuring cell according to claim 1 where the cell diameter is in the range of 5 to 80 mm, preferably in the range of 5 to 40 mm.

18. A measuring cell according to claim 1 where at least one of the surfaces of housings (1, 4) is coated with an electrically conductive film for the purpose of shielding.

19. A process for manufacturing an Al_2O_3 membrane for a measuring cell which comprises the following steps:

a. forming a membrane from an Al_2O_3 slurry;

b. heating the membrane in a furnace a first time to sinter the membrane, with subsequent cool-down;

c. heating the membrane a second time for smoothing the membrane, with subsequent cool down.

20. The process according to claim 19 where a third heating step is performed for smoothing.

21. The process according to claim 20 where the sintering temperature of the first heating step is higher than the temperature of the subsequent smoothing step or steps, preferably by no more than 100°C.

22. The process according to claim 19 where, during the smoothing step or steps, membrane (2) is smoothed by pressing it between flat plates, particularly by loading the plates with weights.

23. The process according to claim 22 where membrane (2) is detached from the plates between smoothing steps and redeposited in offset position.

24. A process for manufacturing a measuring cell, comprising the following steps:

a. manufacturing a first Al_2O_3 housing plate (1) with an electrically conductive surface (7), a connecting opening (14) that interconnects the surfaces of plate (1) and featuring two electrical, vacuum-tight feedthroughs (6) where one feedthrough (6) is electrically connected to the conductive surface (7);

b. manufacturing a second Al_2O_3 housing plate (4) with a connecting opening that interconnects the surfaces of plate (4) where, on plate (4), a sealing connecting port (5) that communicates with the line is installed;

c. manufacturing of an Al_2O_3 membrane (2) by a process according to claim 19 and subsequent coating of the one membrane surface with an electrically conductive film (7);

d. installation of the plates (1,4) in such a way that membrane (2) is positioned at a certain distance between the plates (1,4), and its peripheral edge zone is sealed vacuum tight with the plates (1,4), and that the electrically conductive layers (7) of the first plate (1) and the one of the membrane (2) are mutually opposite and constitute the measuring capacitance by defining a reference vacuum chamber (25), where layer (7) on membrane (2) is electrically conductive and connected to the other feedthrough (6) of the first plate (1), and the surface (7) which points away from connection port (5) of the second plate (4) together with membrane (2) defines a measurement vacuum chamber (26);

e. pumpdown of the reference vacuum chamber (25) by line (14) under activation of a getter (10) that is connected to line (14) where, after attainment of the desired vacuum, the line (14) with getter (10) is closed vacuum tight (8).

25. The process according to claim 19 where the membrane shape is cast or pressed from the Al_2O_3 slurry, preferably from a ribbon-shaped Al_2O_3 green body supported on a carrier foil, and which is subsequently pulled off the foil.

26. The process according to claim 24 where the membrane shape is cast or pressed from the Al_2O_3 slurry, preferably from a ribbon-shaped Al_2O_3 green body supported on a carrier foil, and which is subsequently pulled off the foil.

27. The measuring cell according to claim 1 wherein said measuring cell is capable of measuring pressures smaller than 1000 mbar with a resolution of better than 1%.

28. The measuring cell according to claim 27 wherein said measuring cell is capable of measuring pressures smaller than 1 mbar.

29. The measuring cell according to claim 28 wherein said measuring cell is capable of measuring such pressures with a resolution of better than .3%.

30. The measuring cell according to claim 27 wherein said measuring cell is capable of measuring such pressures with a resolution of better than .3%.